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PROCEEDINGS

OF

THE ROYAL IRISH ACADEMY.

1838. No. 12.

May 14.

SIR WM. R. HAMILTON, A. M., President, in the Chair.

Henry Watson, Esq., William T. Kent, Esq., and John Thompson Young, Esq., were elected members of the Royal Irish Academy.

His Excellency, the Lord Lieutenant, attended the meeting as a guest.

The President read the conclusion of the paper by the Rev. Dr. Hincks, "on the Years and Cycles of the ancient Egyptians."

According to the views advocated in this paper, a lunisolar cycle of 600 years was in use prior to the deluge, its epochs being at the autumnal equinox in the years B. C. 3567, 2967, &c. The knowledge of this cycle was preserved by Noah, and diffused through the different nations at the dispersion. It was certainly used in Persia and in Egypt. In the former country, the commencement of the year was fixed at the vernal equinox by Jamshid; the epoch of this change being 7th April, 2007 B. C., when 360 years of the current cycle had elapsed. The Persian years were however reckoned from the first day of the following cycle, that is, from 6th Feb. 1767; between which and the era of Yezdigerd (16th June, A. D. 632) there elapsed exactly 2400 years of 365 days, that being the form of year introduced by

Jamshid. In Egypt, the commencement of the year was fixed at the time when the inundation of the Nile had sufficiently abated to allow the operations of agriculture to commence; and it was observed in the first instance rudely, by a nilometer, but afterwards with greater accuracy by a gnomon: the first day of the year being the first day in which the meridian shadow of an object had attained to a standard length; which standard length appears from calculation to have corresponded with a south declination of about $12\frac{1}{4}°$. The solar year, intervening between the successive occurrences of this phenomenon, was greater than the mean tropical year, on account of the changes in the equation of the sun's centre, and in the obliquity of the ecliptic; and is shewn to have been about 1767 B. C., neglecting the perturbations caused by the moon and planets, 365,243246, differing little from 365,2433 . . . which would be its length, if the phenomenon gained a fifth part of a year, in 300 years of 365 days. The Egyptians, observing this equality, and being dissatisfied with the year that they formerly used, on account of the 366th day, which, occurring in every fourth or fifth year, disordered their calendar, resolved that with the next cycle they would limit the year to 365 days, allowing no more intercalations. This change they accordingly made, on the 8th Nov. 1767, from which date they commenced not only a new lunisolar cycle of 600 solar years, that is $600\frac{2}{5}$ years of 365 days, but also a cycle of the seasons, consisting of 1500 solar years, or 1501 years of 365 days. The recurrence of either of these cycles was celebrated as the return of a phœnix; and those mentioned by Tacitus, as having occurred under Sesostris, Amasis, Ptolemy Philadelphus, and Tiberius, are fixed in the autumns of the proleptic Julian years, 1167, 567 and 267 B. C., and A. D. 34. The date thus assigned for the reign of Sesostris agrees with that which Mr. Cullimore has deduced from the astronomical sculptures on the memnonium. The great period of 3000 years being the least common multiple of the two cycles, is mentioned by Herodotus as the apocatastatic period used by the Egyptians.

Professor Kane read a paper "on the Theory of Ammoniacal Compounds."

In this paper the author first noticed the various hypotheses which had been from time to time proposed to explain the nature of the combinations formed by ammonia, and adverted particularly to the remarkable fact discovered by Mitscherlich, of the isomorphism of $NH_3 + HO$ with $K.O$, and to the principle deduced by Dumas from the properties of oxamide, that NH_3, by losing an equivalent of hydrogen, formed a compound resembling very closely, and capable of replacing in combination, the simple bodies of the chlorine group.

In the theory proposed by Dr. Kane, it is laid down as the fundamental proposition, that ammonia NH_3 must be represented as a compound of the body NH_2 and of hydrogen, that is, that ammonia, as gas, is amiduret of hydrogen. The hydrogen of this body, outside the radical, may be replaced by the various metals, or by radicals of organic origin, and hence the amide of potassium, of benzoyl, &c. These amides, resembling remarkably the chlorides, may unite with chlorides or oxides of the same, or of different metals, and hence the most general proposition, that in the great mass of the various ammoniacal combinations, their real nature assimilates them to complex metallic compounds, an amide of hydrogen, or of a metal, having united with a chloride, oxide, &c. of hydrogen, or of a metal.

Thus sal ammoniac is considered in this theory as a compound of chloride of hydrogen with amide of hydrogen, and the oxide of hydrogen, united with amide of hydrogen, forms the basic element of the ordinary ammoniacal salts. In like manner, chloride of mercury, united with amide of mercury, forms white precipitate, and calomel, united with the corresponding amiduret of mercury, forms the black powder described by Dr. Kane in a former paper. A great series of salts can likewise be obtained, which contain oxides of copper, of nickel, or of zinc, replacing the oxide of hydrogen in the ordinary ammoniacal salts; and so, in like manner, the amide of hydrogen, being capable of replacing, and of being replaced by, oxide of hydrogen in all its functions, there originates the class of basic salts, in which oxide of hydrogen is replaced by ammonia, or in which the hyperbasic equivalents of oxide are replaced by amides, or partly by amides and partly by oxides of the same metal, or of hydrogen.

To this class is referred, in great part, by Dr. Kane, the compounds formed by the absorption of ammoniacal gas, by chlorides of various bodies; thus, chloride of phosphorus and amide of hydrogen, chloride of tin and amide of hydrogen. In these bodies, the author stated, that one portion of the ammonia was generally retained more powerfully than the other, and this fact he considers to result from a dissimilarity of function in the various parts, similar to that which Graham had already pointed out in water. Thus there is

$$1 - cu\,cl + NH_3 + 2\,NH_3$$
$$2 - cu\,cl + NH_3 + NH_3.HO$$
$$3 - cu\,cl + NH_3 + 2\,HO$$
$$4 - cu\,cl + HO + 2\,HO$$

where the progress of the replacement is evident.

The compound $NH_3.HO.$ replacing potash, the author conceives that substituting for it metals of the same family, the bodies $NH_3.cuo$ and $zno.NH_3.$ should be capable of the same function; and he adopts the view suggested by Graham, that certain compounds of this kind may correspond to the ordinary double salts. Thus

$$cuo.SO_3 + NH_3.cuo.SO_3 + 4\,NH_2.H$$

corresponds to $cuo.SO_3 + NH_3HO.SO_3 + 4\,O.H$

and following out this view, along with those already described, it becomes necessary to look upon the so-called compound radicals in a new manner.

Assuming as proved, that $NH_3.HO$ replaces KO, and $NH_3\,HCl$ replaces KCl, hence, NH_4 replaces K.; but NH_4 is NH_2+H+H. That is, a sub-amiduret of hydrogen, compounding to certain suboxides and sub-chlorides. It may be isolated, but all that the author asserts is, that NH_3+HCl acts as $K.Cl$. He considers it impossible to avoid giving to $NH_3 + Cu\,Cl$ and $NH_3 + Zn\,Cl$ the same rank, and hence the transition to $Hg\,NH_2 + Hg\,Cl$, and similar combinations. He conceives that we cannot, in the present state of our knowledge, assign to the bodies $NH_3\,Cu$, or $Hg\,NH_2.Hg$ the title of compound radicals, or give to them specific names, and, therefore, whilst he retains the word ammonium as convenient, and looks to the isolation of it, and to its resembling a sub-oxide, and not a metal, he considers the oxide of ammonium as more properly an oxamide of hydrogen, and sal ammoniac as a chloramide of hydrogen, as the white precipitate is chloramide of mercury, and so with various other bodies.

In the development of the theory of compound radicals, which arose from the author's investigations, two consequences were obtained, viz., that the amide replacing oxide of hydrogen, the bodies $HO.SO_3 + HO$, or $CuO.SO_3 + HO$, assimilate themselves to $HO.SO_3 + NH_3$, or $CuO.SO_3 + NH_3$, and thence the water designated saline in Graham's memoir, forms, with the metallic oxide, a compound base, to which the theory must eventually be applied; and, secondly, the further extension of the investigation shews the difficulty of drawing a line between these and the proper basic salts, of which a great number has been examined by Dr. Kane, for the purpose of obtaining evidence on these points, and the result has been, that such basic salts are constituted on the same type as the neutral salts of the same family, the water being replaced by oxide of a metal, and in many cases the metallic oxide becomes likewise hydrated by combined water; that the equivalents of oxide are not all retained by the same force, and that if we grant to ammonium the title of a compound radical, it becomes very difficult to refuse to the basic salts, as a class, the position or title of neutral salts of compound bases, of a nature nearly similar.

Mr. Petrie read a paper on "ancient Irish consecrated Bells."

In this paper the author has first endeavoured to ascertain the period of the introduction of bells into Ireland, and states, that though it is possible that they might have been in use previously to the introduction of Christianity, he has not found the smallest authority from which it could be inferred that they were so. He next shews that there is abundance of evidence to prove, that in and from St. Patrick's time, they were generally used for the services of the church, and that the consecrated bells of the first teachers of Christianity in Ireland were afterwards applied to various superstitious purposes, of which he gives a great number of examples, from the lives of the Irish saints, ancient historical poems, annals, and other records. These bells were preserved in the churches to which they had originally belonged, and were usually enshrined in cases of the most costly materials and elaborate workmanship. The author proves that many of these bells of the earliest Christian times, though hitherto unknown to the literary world, still remain in Ireland; and he exhibited from his own museum a bell, which is celebrated in Irish history, as one of the chief relics of the people of the north of Ireland, namely, the Clog-an-udhachta, or bell of St. Patrick's will. He afterwards exhibited drawings of several ancient bells, and among others, of St. Senanus's bell, called the golden bell, preserved in the county of Clare, and the bell of Armagh, now in the possession of Adam M'Clean, Esq. of Belfast. This bell is covered by a case, or shrine, of exquisite beauty of workmanship, and the inscriptions on it shew that it was made at the expense of Donald Mac Loughlin, King of Ireland, for Donald [Mac Amalgaid,] Primate of Armagh, at the close of the eleventh century. The name of the hereditary keeper of the bell is also inscribed on the cover, and it is remarkable that it was in the possession of one family from the period in which the case was made until it passed into Mr. M'Clean's hands. The names of the artists who made the case are also given, from which it is proved to have been of Irish manufacture.

All these bells are of a quadrangular form, and vary in height from four to fifteen inches; and that they are of the antiquity assigned them by popular tradition the author proves by a chain of historical notices, collected from the Irish annals and other records.

DONATIONS.

Registrum Vulgariter nuncupatum, " The Record of Caernarvon ;" è codice MS. Harleiano 696. *descriptum.* Printed by command of Her Majesty, under the direction of the Commissioners on the Public Records. Presented by the Commissioners.

Rotuli Chartarum in Turri Londinensi. Accurante Thoma Duffus Hardy, S. S. A. è Soc. Int. Templ. Lond. Vol. 1, pars 1. Ab anno MC. XCIX. ad annum MC. CXVI. Printed by command of his Majesty, King William IV., under the direction of the Commissioners on the Public Records. Presented by the Commissioners.

General Report of the King in Council, from the Honorable Board of Commissioners on the Public Records, appointed by His Majesty King William IV., by a Commission dated the 12*th of March, in the first year of his reign; with an Appendix and Index.* Printed by command of His Majesty

King William IV., under the direction of the Commissioners on the Public Records. Presented by the Commissioners.

Catalogue of the Library of the Society of Writers to the Signet. In four parts, with a General Index. Printed for the use of the Society. Presented by the Curators of the Signet Library.

Medical and Physical Researches; or, Original Memoirs in Medicine, Surgery, Physiology, Geology, Zoology, and Comparative Anatomy. By R. Harlan, M.D., F.L.S., Lond. Presented by the author.

Comptes Rendus Hebdomadaires des Séances de l'Academie des Sciences. Par MM. les Secretaires perpetuels. Premier Semestre, No. 13, 14, 15, 16, for 1838. Presented by the Academy.

Abhandlungen der Königlichen Akademie der Wissenschaften zu Berlin. Ausdem Jahre 1835. Presented by the Royal Academy of Sciences, Berlin.

Preisfrage der Philosophisch. historischen Klasse der Königlich. Preunischm Akademie der Wissenschaften für das Jahr 1839. Two copies. Presented by the same.

Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Konigl. Preuss. Akademie der Wissenschaften zu Berlin. Erster Jahrgang, 1836, and Zweiter Jahrgang, 1837. Presented by the same.

Statique de la France; publiée par le Ministre de travaux publics, de l'Agriculture et du Commerce. Presented by A. Moreau de Jonnés.

An Original Portrait of Sir Isaac Newton, painted by Wills. Presented by Rev. Prof. Lloyd, V. P.